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2002

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TOWARDS VARIATION OR UNIFORMITY? COMPARING TECHNOLOGY-USE MEDIATIONS OF WEB-BASED GROUPWARE

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ABSTRACT

This case study discusses variation and formalization strategies for managing technology-use mediation of Web-based groupware technologies in an organizational context. Research and development projects of a multi-national pharmaceutical company entail a close collaboration between many geographically distributed actors. The use of a groupware technology in long term, cross-disciplinary and distributed development projects has been investigated in order to understand how Web-based technologies for collaboration become part of organizational work practices. In this paper, the work of project assistants in setting up and promoting the technology is described and analyzed as technology-use mediation. The ways in which the project assistants position themselves as system administrators by delegating access rights, providing content, and advocating use among development project members are identified as crucial to the integration of the groupware technology in work practices. Two configurations of the groupware technology and the cooperation within the development projects are compared under the metaphors of "the ultimate communication tool" and "a set of private and safe workspaces" respectively. The differences between them are brought forth to discuss the roles of the project assistants and the variety of ongoing meta-structuring activities. In conclusion, formalizing the technology-use mediations is discussed as beneficial if it renders the position of the project assistants more visible within the organization. This need not induce uniformity of configurations across the development projects, but might strengthen the mediating position of the project assistant and how well the groupware technology is suited to the local work practices.

INTRODUCING SPECIFICITIES OF GROUPWARE TECHNOLOGY, THE PHARMACEUTICAL COMPANY, AND THE CASES IN QUESTION

Studies on information systems based on Internet standards point towards a number of differences from traditional information systems. When applied in corporate intranets, Internet standards open up for a dynamic configuration of structure, content and access, changing the scope and reach of these systems. Some studies have described how these technologies imply shifting or blurring the roles of designers and users (Lyytinen, Rose & Welke 1998; Lamb & Davidson 2000) or how the control of content can be distributed among many users in new ways (Dix 1997). The existing literature about intranets has its primary focus on either technological issues, implementation issues, or different types of use. The shift in roles unsettles the distinctions that set use apart from the work of configuring or designing an application running on an intranet, such as a groupware technology. We have thus identified a need for in depth studies of how groupware technologies become part of organizational work practices, how it is that traditional roles of user, designer or content provider are affected by technological changes. In this article we therefore investigate the details of two different configurations and discuss how these come about through two different forms of technology-use mediation (Orlikowski, Yates, Okamura & Fujimoto 1995).

PharmoCo (a pseudonym) is a large multinational pharmaceutical company engaged in the discovery and production of new medicines and pharmaceutical devices. Bringing a new medicament or device to the world market involves many steps from the earliest research efforts to clinical tests, fabrication, marketing as well as distribution and brings together many professions, technologies, and organizational units spread across continents. In PharmoCo this process is organized in large projects that may comprise several hundreds of people and last up to fifteen years. These development projects are managed by a project manager, a project assistant, and the management group consisting of working group leaders, also called 'the core group'.

PharmoWeb is a Web-based groupware application developed by the internal IT department in PharmoCo and introduced to project management in 1998 to support communication, cooperation, and coordination within large, long term, and geographically distributed research and development (R&D) projects. The system is based on Internet standards and accessed through a Web browser. Our studies of PharmoWeb, taking place three years after the initial implementation, have identified a complex array of elements that make PharmoWeb what it is: Appearance, descriptions and visions of what PharmoWeb can do, configuration and material set-up, and use in practice. We have elsewhere considered how these elements together may explain the different uses and various configurations of PharmoWeb (Henriksen, Nicolajsen & Pors 2001).

We thus view intranet technologies in use as socio-technical systems in which technologies, actions and people are formed through the relations they engage in. This means that technology is approached as part of practice, rather than a bounded application predefined in technical terms. This approach is nicely captured by the concept of *configuration* describing the design of a working technology as a continuous process of adjustments between heterogeneous elements (Aanestad forthcoming). The configurations in question are studied as the PharmoWeb application in relation to other elements of the work practices of development projects. Moving beyond a discussion of differences in use within each project, we also found profound differences across projects. In this article we pinpoint the project assistants as important actors in shaping these configurations.

This role of shaping the technology, and thus influencing the use activities of others, is afforded by the position of the project assistant as a coordinator of project activities, as communicator of project news in conjunction with their technical role as "system administrators" of PharmoWeb. As a system administrator a project assistant is responsible for setting the appearance of the specific PharmoWeb by choosing logo, colours and layout. They define and maintain the categories of different types of content and distributing access rights for uploading content as well as developing content on their own. Furthermore, several project assistants advocate the use of PharmoWeb through out their project.

The role as system administrator is thus in part constituted technically by an access to the 'Admin' section of PharmoWeb, but it is open to interpretation as there are no clear organizational or managerial definitions or requirements concerning this role. To detail and conceptualize the work of project assistants we will compare two different configurations found in use in current development projects. Drawing on the project assistants own metaphors, these will be referred to as: PharmoWeb as "the ultimate communication tool" and PharmoWeb as "a shared space for distributed projects". Each configuration affords different possibilities of use and integration of the application within the work practices of the project members. We investigate how the differences between configurations are created and performed through different ways of envisioning the technology, variations in the distribution of access rights as well as different ways in introducing and educating people in the use of the application. The analysis is structured with the framework of *technology-use mediation* (Orlikowski et al. 1995) understood as the meta-structuring by the project assistants of the use practices of others. In the concluding discussion, other literature on intranet implementation (Lamb & Davidson 2000, Scheepers 1999) is drawn upon to elaborate on variation and formalization strategies for managing technology-use mediation of intranet technologies.

RESEARCH METHOD

Our ongoing case study started in fall 2000. Our investigations have focused on three different development projects in which PharmoWeb is employed, two of which are discussed here. We have conducted 20 semi-structured interviews with various actors each lasting one to two hours. These actors are project assistants, the responsible for PharmoWeb within the project management department, the main IT-developer of the application as well as different members of the core group of projects and users without management obligations. Besides the interviews, our empirical material covers observations of every day work situations and a one-day design workshop. Observations of project assistants comprised approximately 60 hours of informal "hanging around" and note taking. Also, document analysis of the PharmoWeb user manual and presentation material about the application and organization has informed the study. Lastly, we have looked at use statistics generated by the system and have ourselves examined the application as it is used in the different projects and work settings. In the analysis of the empirical material we have focused on descriptions and every day uses of the application, what type of work tasks and interactions the application was relevant to, and ways in which these tasks and cooperation in each of the development projects was transformed. In an initial analysis of the various elements and relations that shape PharmoWeb configurations, project assistants became central topic of interest. Their work was subsequently followed up with the observations mentioned above as well as a focus group interview in which an earlier draft of this paper was shared and discussed with four project assistants.

TECHNOLOGY-USE MEDIATION AND META-STRUCTURING

To describe the role of project assistants in shaping the use of PharmoWeb within the development projects we have chosen to use the framework of Orlikowski et al. (1995). These authors discuss the ongoing adaptation of a communication technology in use based on a study of an asynchronous conferencing system in use in a R&D project. They focus on the role of a few individuals who were particularly active in shaping user's interactions with the system by modifying features of the technology and adjusting organizational policies and norms related to system use. This process is discussed as *technology-use mediation*, as a type of *meta-structuring activities* performed by these mediators with regard to the technology use of others. The study recognizes that shaping of use is not a one shot activity but rather an ongoing process incorporating and negotiating different and sometimes conflicting requirements and wishes. Different types of meta-structuring activities can be differentiated into four overall categories: establishment, reinforcement, adjustment and episodic change (Orlikowski et al. 1995).

Establishment is about creating certain positions and roles for carrying out meta-structuring activities, allowing certain actors to set up physical configuration of the system, determining guidelines and building consensus around use and use mediation. This may include modifying organizational arrangements, adjusting technical aspects of the system, as well as securing technical resources for use and support. Reinforcement refers to the training, monitoring, follow-ups with users to advocate use and reinforce established guidelines. Adjustment is based on feedback concerning the material configuration, rules for use and guidelines that subsequently are adjusted or redefined. Lastly, episodic changes refer to major changes to the whole system through redesign of technical functionalities or institutional properties.

The main interest of Orlikowski et al. is to see how this process may be applied as an "organizational mechanism" for facilitating an ongoing adaptation of communication technologies in organizations where conditions and contexts continually are undergoing transformation. They argue that use practices should be separated from technology-use mediation in order to gain an understanding and possibilities for strengthening such processes, since "the use of a new electronic medium within a community is strongly influenced not just by users but also by those individuals who implement the technology, provide training, propose usage guidelines, and alter the technology to adapt it to changing conditions of use." (Yates, Orlikowski and Okamura, 1999, p. 83).

This concept of technology-use mediation has been an extremely useful approach for thinking about the work of project assistants and Pharmoweb's integration in development projects. When comparing the empirical case of Orlikowski et. al and ours, they differ in a number of ways - most interestingly in the way that very few guidelines and rules for set-up and use of the groupware technology exist in PharmoCo. In Orlikowki's et.al. the process of metastructuring occurs as an introductory phase of implementation where best practices for use and integration in work practices are provided and followed up through reinforcement. In our case, the metastructuring activities are ongoing, non-regulated and not explicitly aimed at the development of a correct or most efficient use practice. Rather these have unfolded through improvisation and trials and have produced co-existing configurations or variations of a groupware technology.

METASTRUCTURING ACTIVITIES OF PROJECT ASSISTANTS IN PHARMOCO

To grasp the specifics of project assistants' technology-use mediation, we will first take a closer look at PharmoWeb. As an application it resembles the interface of an ordinary Web page shown through a browser. At the top of the page is the title and logo of a specific development project displayed. Underneath is a banner divided in a number of index categories with each heading indicating the various layers, pages and features available. The index categories vary according to the specific project, but typically include the default categories Home, Documents, Tools, Admin, and Help. Home is the entry page that shows recent news and events concerning a project. The 'Documents' section is where meeting minutes, status reports, presentation templates, and ongoing work documents may be uploaded, shared and archived. Tools is a section with yellow pages providing phone numbers and locations of all project members and an option for receiving personalized email notification of changes that have been made. The Admin index is only visible to those delegated the technical role of system administrators. Under Admin the system administrator can alter the graphical appearance and lay out of the pages, add index categories to the top banner or document folders, insert new users and create member groups, give or restrict access rights of users to upload to and view sections. This work is in the hands of the project assistant and the project director of each development project. In the two cases compared below, the project assistant is however the one actually using this Admin section and thus focus for our analysis.

Few official rules and guidelines exist to formalize or establish the use of PharmoWeb in the work of project assistants. A management guideline states that PharmoWeb should be the development projects main tool for sharing documents, that all project members should have reading access and that at least core group members (leaders of the working groups of the project) should have uploading

rights. An employee in the management department, Leigh, has the position of a head system administrator and has the overall responsibility for all PharmoWebs within the department of project management. She serves as the main technical support and coach for project assistants with regard to PharmoWeb. She is able to survey all PharmoWebs and offers advice to the project assistants in their use of the application. Apart from having introduced PharmoWeb when it was first available and writing the user manual mainly about the Admin functionalities, she currently interferes only when asked or if she notes unhandy or problematic solutions. Leigh is also the one responsible for contact to the internal IT department and collects wishes and requirements for new functionalities. Leigh has therefore been a central actor in the introduction and establishment of PharmoWeb as well as the one providing direction concerning the more profound episodic changes and revisions of the application as such. PharmoWeb as an overall system has undergone three major revisions while being in use by project management. The application has in general moved towards an increasingly flexible and modular system architecture as well as more possibilities for customization for specific projects and use situations. This is a result of the demands grown out of the uses and experiences gained by the project assistants and the active involvement in development processes by Leigh as the head system administrator.

The structure of a particular PharmoWeb in use is made up in part by the project assistants and below we compare the two projects where Janet and Paula are project assistants. When initially setting up PharmoWeb they select the colors and a project logo to be displayed on every screen of PharmoWeb related to the particular project. They establish and continually maintain the menu categories and a hierarchy of document folders based on the built-in default structure. Janet and Paula also frequently create news items on newest developments within the project – what milestones or deadlines have been completed – and provide more general documents describing at what stage the project is, such as time schedules and diagrams of the current organizational structure. It is also the task of project assistants to maintain address information on members, member groups and upload monthly status reports, meeting minutes, cases stories or articles relevant to the potential success of the product.

Hereby both Janet and Paula also contribute to content of the system. Apart from customizing the system, contributing to content, the position of the project assistants also implies motivating and advocating PharmoWeb as useful to support the project members. With regard to both establishment, reinforcement and adjustment, the strategies of Janet and Paula differ in consequential ways for how PharmoWeb is used and integrated in project work practices. In the following we will give two examples of quite different PharmoWebs in use in order to discuss the different meta-structuring activities of the project assistants. These configurations are named by the project assistants as “an ultimate communication tool” and “a set of private and safe workspaces” and we use these terms as metaphors for the configurations, since they capture how they are shaped by the different forms of technology-use mediation.

CONFIGURATION ONE: THE ULTIMATE PROJECT COMMUNICATION TOOL

The first project assistant we met was Janet, who pictures the intranet technology as a medium for communication. Janet speaks of the PharmoWeb used in her project as her own, and she describes herself as ”webmaster for my users”. Part of her job description is to keep everybody informed about, what is going on in the project. For this purpose she describes PharmoWeb as the “ultimate project communication tool”. PharmoWeb enables her to keep everybody up to date and have all the relevant documents available online in their most recently updated versions. The following excerpt summarized the way she envisions PharmoWeb: “The whole idea is to have a 24 hour service, in order to make them [the members of the project] independent of my presence or the project manager. All imaginable documents must be available...”

She explains that revising timetables and development plans is crucial to the work of project assistants and before the introduction of PharmoWeb this was a troublesome task to continuously send out changes and revisions. Now all these documents are co-located in PharmoWeb, establishing

PharmoWeb as the place where the most recent versions can quickly be found by project members alleviating the requests for information that previously were directed towards her. She also emphasizes the advantages of using PharmoWeb for presenting news about the progress of the project, for example supplying pictures from the first clinical trial testing on people, as well as keeping a current directory of members so people can locate one another and obtain an overview of member groups. Janet's task of keeping project members informed and motivated, is thus made easier and specific requests for documents and information from peripheral members to Janet are reduced remarkably.

As a system administrator, Janet has reserved administration and uploading rights to herself, the project manager and the other core group members. Since she has restricted the number of persons with uploading rights, almost all the documents in PharmoWeb are entered by her. This way of use is seen (by Janet and other project members) as a service and a way to keep PharmoWeb structured, but it is also restricting the development of more local use forms. She both writes items herself and receives content via e-mail. Janet then uploads the documents in the structure in the correct place and notifies the relevant project members by email. She hereby maintains the system as an orderly archive and ensures that newest events and information always are posted on the home page.

In order to advocate use of PharmoWeb Janet does not send out information or documents attachments in emails anymore. She does, however, often send out notifying emails with a link to the relevant page in PharmoWeb and a short description of the information. Through this procedure we argue that she is both establishing and reinforcing a specific use of PharmoWeb. In order to make all project members more aware of the site and revisions to it she distributes the site link (URL) in emails and at other occasions such as meetings or project seminars. To circumvent user reported difficulties and ease use, she has included troubleshooting information on the front page, where by she adjust the system to user requests. There is, for example, occasionally problems downloading power point slides, and she has made a note on the homepage inviting people to contact her, so she can email the presentations.

In this configuration the distribution of access rights and content responsibility resembles a newsletter or publishing of information from centre to periphery. In this way, groupware technology is shaped as a very useful project communication tool for carrying out specific tasks and services related to development projects as it substitutes other communication media such as photocopying and internal mail as well as telephone calls and e-mails with attachments.

CONFIGURATION TWO: A SET OF PRIVATE AND SAFE WORKSPACES

Almost next door to Janet we met Paula, who is the project assistant in a project developing a new device in a joint venture, where PharmoWeb serves as an extranet for the different companies involved. One major difference between this configuration and the previous is the way in which access rights are delegated by the project assistant. By distributing uploading rights and the possibility to make restricted areas to all project members, Paula pictures and establishes the intranet technology in her project as a set of private and safe workspaces.

In explaining her strategy Paula states that this set up corresponds to the espoused needs from the working groups cooperating with partner firms in other parts of the world, thus this establishment is rather an adjustment to user requests. These external partners have different quality and regulatory systems that must be supported in different sections of PharmoWeb. In addition, they need different folders that represent their diverse divisions of work and documentation needs. In order to support this diversity, Paula has adjusted PharmoWeb the folder categories as well as given everybody the possibility of uploading documents and restricting access to them. When a project member uploads a document he or she can select which sub-groups or specific persons within a sub-group are able to see the specific document as part of their PharmoWeb. These restrictions give sub-groups the possibility of exchanging documents and information that either are specific to those groups or that perhaps are not yet ready to be published for the entire project because of an unfinished draft status with tentative conclusions. In other projects such as Janet's described above drafts are mostly circulated within sub-

groups as email attachments or shared through the Local Area Network. However, in this particular development project the exchange of documents via PharmoWeb is viewed as more secure and easier compared to encrypting documents in emails. As Paula states it: "We needed a place where we could have the documents despite the distance. I mentioned security before - when we send an email there are all sorts of possibilities for opening it…"

Paula regularly reinforces the use of PharmoWeb in different ways. At meetings she and the project director encourages the core group members to use PharmoWeb and foster the use within their working groups and in the cooperation with the external partners. Paula also gives informal one-person advice on use of the system, whenever anybody shows interest or has a specific problem to be solved. Also, Paula surveys project progress via pages that display most recent documents or use statistics. If she finds specific content missing, such as a response, or an action point she contacts the relevant persons and this way encourages them to make use of the system.

This second configuration thus enables project members to contribute content and has become integrated in more localized and specific work practices in peripheral subgroups for collaboration. For example, we found PharmoWeb being used as the main tool in the marketing group for exchanging specific advertisement ideas and coordinating the marketing initiatives between countries. Paula has created a document folder entitled "drafts for commenting" specifically for co-authoring of working documents that are premature for publishing. In this configuration, the delegation of access rights, combined with the specific folder for unfinished documents led to close integration of the groupware technology in very specific work task within small well-defined workgroups.

EXPLICATING THE TASKS OF METASTRUCTURING IN PHARMOCO

As illustrated above the four different tasks of meta-structuring i.e. establishment, reinforcement, adjustment and episodic changes are to a large extent but not only carried out by the project assistants. How ever as illustrated in the two configurations, project assistants have a pivotal role in mediating usages of the groupware technology. The way the project assistants go about these tasks are different and crucial for how the technology is shaped. The two examples are success stories, cases where the technology works as an important and integrated part of development projects. In other projects, where the project assistant is less interested or perhaps without skills or experiences of the possibilities of PharmoWeb, we found very limited use. It was emphasized among our informants that the possible use of PharmoWeb to a large extent was dependent on the interest of project assistant and her personal drive concerning PharmoWeb. Although apparently recognized within the organization, these tasks and the differences in strategies were not made explicit nor discussed across projects. Several project assistants noted that time and resources where not allocated specifically to the projects assistants administrative and maintenance work. Furthermore, the sharing of experiences or discussing differences across projects - which initially took place at weekly meetings in the department of project management had since been somewhat limited and on a very informal basis peer to peer. It seems that strategies are individual, largely experimental and the result of local preferences and perceived needs within the specific project. This is in accordance with the general impression of PharmoCo governed by an open and experimental approach to new technologies when they are proven useful – otherwise they are dropped.

What we have found is that project assistants have profound effects on how users perceive and integrate PharmoWeb in their work, particularly through different ways of fulfilling the technical role of system administrator as well as ways of organizing and providing content. To grasp the project assistant's part of meta-structuring we argue this task should be differentiated in three positions of the project assistants in relation to PharmoWeb as system administrators, content providers, and advocates. Explicating these may make the specific work of project assistant's meta-structuring and its subsequent consequences more visible and open for discussion within PharmoCo.

The differentiation into three positions to explicate the tasks that project assistants carry out in their technology-use mediation: System administration, content providing, and advocating use are analytical constructions based on the empirical material gathered. We argue that these might be applied to more explicitly discuss the position of technology-use mediators in relation to PharmoWeb. As illustrated by way of the two configurations, these three overall tasks may be carried out differently and have varying consequences for the integration and unfolding of a groupware technology.

As system administrator in the extranet project Paula configures PharmoWeb as a set of private and safe workspaces easing the coordination within the distributed working groups and between the foreign partners of the joint venture. This work within subgroups of the project was problematic due to the hassle of encryption of e-mail and geographical and time differences constraining the work time overlap to only a few hours. In this project, Paula's delegation of uploading rights has made it possible for PharmoWeb to evolve as a workspace for smaller groups, where it becomes vital to be able to restrict access to these areas from people outside the group. When used for close cooperation PharmoWeb becomes less of a database or archive and more into an interactive working tool as part of the ongoing practice. The way in which Paula carries out system administration thus shapes what the system is, how it may be used, as well as her own daily work that consists of maintaining groups and index categories. Likewise, Janet's delegation and service creates PharmoWeb as a communication tool and positions herself as "webmaster" or gatekeeper.

Secondly, both project assistants publish project news and other items thus providing content in PharmoWeb. This is used to provide information on status on activities and people of the project. This works as an overview or basis for coordinating the different phases and tasks to be done. Both projects have an overall project plan, available through PharmoWeb, with milestones and more detailed parts. Here different groups and people can see what and when they or others have to deliver. These plans are updated and followed up continuously or on a weekly basis by the project assistants. Yellow pages, maintained by project assistants, are likewise used quite extensively, especially where the project assistants has extended the basic telephone index with data on occupation and department of the different members, making the index useful for more than seeking phone numbers on a well-known colleague. Lastly, providing content plays an important part in creating a shared project identity or community feeling. Janet in particular emphasized the importance of graphics, pictures and success stories for creating a sense of community in these large and geographically distributed projects.

The third prominent task of meta-structuring we found concerns encouraging use by advocating PharmoWeb to "their users". Project assistants seem aware of their role as facilitating use, solving problems and pushing use. Both Janet and Paula apply terms of ownership to the system and emphasize the importance of introducing PharmoWeb on project meetings and through emails. Both also mention making certain documents available only by way of PharmoWeb to encourage use and integration of PharmoWeb in project work. In both configurations this work of encouragement was backed up by the project manager.

VARIATION OR UNIFORMITY?

Earlier research within the area of implementation and use of Web-based collaborative technologies discuss differences similar to those depicted above. For example Lamb & Davidson (2000) use the term: *Intranet islands of practice* to explain differences in use as a result of different needs within specific work practices. The authors point to the integration of the respective work task and existing patterns of interaction as an important issue in the understanding of such differences. In line with this literature, we argue that the first step in discussing integration and formalization is to establish a thorough understanding of how variations in use come about in specific settings.

Studies of implementation of groupware technologies have also emphasized the importance of individuals that function as local experts or technology promoters, the benefits of user training, and relevance of adjusting organizational policies and social norms (e. g. Orlikowski 1992). However,

existing literature often treats adaptation as something that occurs during initial implementation and not as continual and ongoing as in the PharmoWeb case. As mentioned, Orlikowski et.al. (1995) discuss meta-structuring mainly in relation to the establishment of adequate and fitting guidelines for use.

Another contribution discusses *Intranet key roles* (Scheepers 1999), how such roles are performed differently and how the formalization of some of these roles affects intranet technology in use. Scheepers' (1999) study of initiation and implementation of a corporate intranet delineates five key roles played in that process. These key roles span from the early idea to coordination and content provision and thus span a broader process than focus of our study. However, Scheepers' identification of the role of "content providers" resembles and differs to the work of advocating use and providing content of the project assistants in interesting ways. Scheeper's content providers include campaign making for local intranet use as well as creating content on behalf of others. Also, Scheepers describes this role as a centralized and formal role taken on by appointed employees, whereas we found this role of content provision as less formalized and varying in degrees of centralization. In the "ultimate communication tool" configuration Janet performs the role of main content provider, gatekeeper or editor of PharmoWeb. In contrast, Paula delegates the task of selecting and publishing content to several users in the second configuration presented. Whether this role of content providing should be formal or informal, centralized or distributed has to be considered in relation to the work practices PharmoWeb is to support. We found the difference beneficial since development projects as well as specific project phases vary and PharmoWeb was made useful for different tasks across the projects.

The three tasks of project assistants as system administrators in setting up PharmoWeb, advocators and content providers can be fulfilled in different ways and with varying results. We found greater use when project assistants not only act as system administrators but also advocate use of the system and provide content on an ongoing basis. These observations are in line with the findings of Lamb and Davidson (2000), who argue that conflated roles (i.e. when more than one of Scheepers (1999) key roles are taken on by the same person) enables a more widespread use of PharmoWeb.

Whether technology-use mediations of project assistants should be more standardized, aiming for one or more similar configurations of PharmoWeb, is a contested issue within the project management department of PharmoCo. The value laden issue at stake is whether the work explicated here should be more formalized and uniform across the projects or if the use should still be open to various interpretations and ongoing experimentation. Formalizing the work of project assistants by enforcing certain meta-structuring activities and not others, would restrict the ongoing development of different usages within the particular context of each development project. Once standard procedures are put in place, the two configurations of "the ultimate communication tool" and "a set of private and safe workspaces" might have troubles co-existing due to the underlying assumptions of the two configurations.

Whether these differences and discrepancies and the interpretative flexibility will continue to coexist, whether a central configuration will be more explicitly and irreversibly built into the system in future versions, perhaps also followed up by recommendations and rules regarding how PharmoWeb should be configured and used is an open question. Our suggestion concerning this issue is to make different configurations – different ways of delegating uploading and access rights, providing content and advocating use – more visible by explicating these tasks and formalizing the exchange of experiences amoung project assistants. Also, the work of metastructuring might be related to the episodic changes, that Leigh plays a crucial role in. In this way the integration of the different kinds of meta-structuring activities might result in PharmoWebs better suited to the changing local work practices of development projects. Project assistants currently disinterested and lacking skills or time might become more involved as mediators and those already engaged might become more open to the variety of configurations and other scenarios that could improve the use of PharmoWeb.

CONCLUSION AND FURTHER WORK

This article has discussed how a groupware technology becomes part of organizational work practices through processes of technology-use mediation. The flexibility of the specific groupware technology in question coupled with various metastructuring practices enable two markedly different configurations of intranet technology to co-exist within one organization. This flexibility may be attributed not only to Internet standards and the groupware technology, but also the possibilities for configuring the technology for project use that are put in the hands of the project assistants. The open guidelines, local circumstances and interpretations, as well as practices of experimentation and improvisation are crucial.

Following the framework of Orlikowski et al. (1995) we have outlined and made explicit the technology-use mediation carried out by a group of actors across pharmaceutical development projects thus gaining an understanding of their position and roles. We have discussed possibilities for supporting such mediation processes differentiating three types of meta-structuring; system administration, content providing, and advocating use. The provision of content has been flagged as particularly important since this role extends the technical aspects of technology-use mediation into the normal use of a groupware technology .

With this aim of explicating and making recognizable technology-use-mediation, its variation and formalization, this paper has intentionally emphasized the interpretations and preferences of the individual project assistants. Further work will examine how these preferences and activities are afforded and informed by the project assistant's contexts of work. Preferences – or the metaphors mentioned – do not reside in the individual project assistants, but are shaped by specific circumstances. Future work will move closer to these contexts and conditions for meta-structuring as well as examine effects upon use practices among project members and how these differ within the two configurations.

ACKNOWLEDGEMENTS

We would like to thank our informants in PharmoCo (the projects assistants in particular for their interest and engagement), Ole Hanseth for drawing our attention to the concept of configurations, fellow researchers in the DIWA research program (especially Jørgen Bansler, Keld Bødker, Erling Havn and Jesper Simonsen) as well as the anonymous reviewers. This research was partly sponsored by the IT-University in Copenhagen, Denmark.

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